US008794024B2

(12) **United States Patent**
Martin et al.

(10) **Patent No.: US 8,794,024 B2**
(45) **Date of Patent: Aug. 5, 2014**

(54) **REFRIGERATOR ICE COMPARTMENT LATCH AND COVER**

(75) Inventors: **Dean A. Martin**, Solon, IA (US); **Chad J. Rotter**, Amana, IA (US)

(73) Assignee: **Whirlpool Corporation**, Benton Harbor, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 540 days.

(21) Appl. No.: **12/955,047**

(22) Filed: **Nov. 29, 2010**

(65) **Prior Publication Data**

US 2011/0067430 A1 Mar. 24, 2011

Related U.S. Application Data

(63) Continuation of application No. 12/694,307, filed on Jan. 27, 2010, now Pat. No. 7,870,754, which is a continuation of application No. 11/331,883, filed on Jan. 13, 2006, now Pat. No. 7,726,148, which is a continuation-in-part of application No. 11/139,237, filed on May 27, 2005, now Pat. No. 7,337,620, which is a continuation-in-part of application No. 11/131,701, filed on May 18, 2005, now Pat. No. 7,284,390.

(51) **Int. Cl.**
F25C 5/18 (2006.01)
F25D 3/02 (2006.01)

(52) **U.S. Cl.**
USPC **62/344**; 62/420

(58) **Field of Classification Search**
USPC 62/344, 420, 424, 441, 402
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,711,944 A * 6/1955 Meek et al. 312/333
3,280,584 A * 10/1966 Grimm et al. 62/344
3,902,331 A 9/1975 True, Jr. et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CN 1340685 A 3/2002
CN 1412509 A 4/2003

(Continued)

OTHER PUBLICATIONS

JP 2-29589—English Translation.

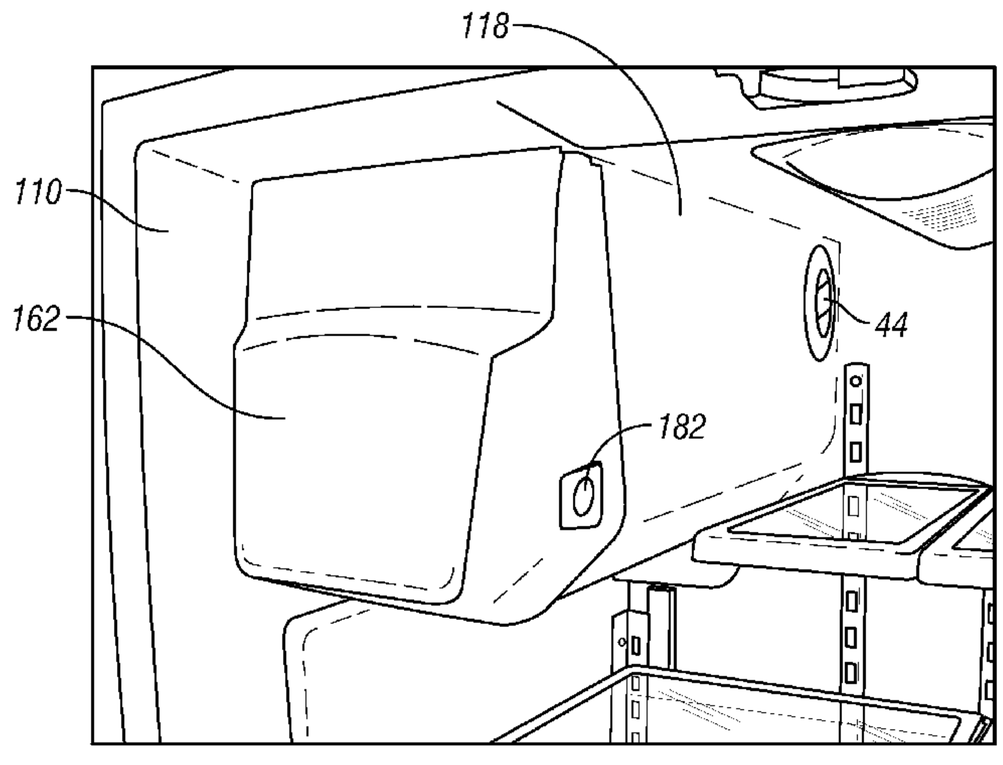
(Continued)

Primary Examiner — Cassey D Bauer

(57) **ABSTRACT**

An insulated icemaking compartment is provided in the fresh food compartment of a bottom mount refrigerator. The icemaking compartment may be integrally formed with the liner of the fresh food compartment, or alternatively, may be modular for installation anywhere in the fresh food compartment. A removable bin assembly with a front cover normally seals the icemaking compartment to maintain the temperature in the compartment. A cold air duct formed in the rear wall of the refrigerator supplies cold air from the freezer compartment to the icemaking compartment. A return air duct directs a portion of the air from the icemaking compartment back to the freezer compartment. An air vent with a damper in the icemaking compartment directs another portion of air into the fresh food compartment. A control system provides for controlling refrigerator functions in a manner that promotes energy efficiency, including movement of the damper between open and closed positions. An improved latch and seal are provided for the ice bin assembly to allow removal of the bin assembly and to ensure a positive seal between the bin assembly and the front cover of the ice compartment.

11 Claims, 15 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

4,209,999	A	7/1980	Falk et al.	
4,333,588	A	6/1982	Schreck et al.	
4,872,318	A	10/1989	Klemmensen	
5,037,004	A	8/1991	Katz et al.	
5,056,688	A	10/1991	Goetz et al.	
D324,869	S	3/1992	Carper	
5,272,888	A *	12/1993	Fisher et al.	62/344
2,717,505	A	9/1995	Andersson	
D372,739	S	8/1996	Bustos	
6,574,982	B1	6/2003	Wiseman et al.	
D484,150	S	12/2003	Becke	
6,735,959	B1 *	5/2004	Najewicz	62/3.63
7,228,703	B2	6/2007	Kim et al.	
D549,745	S	8/2007	Coulter et al.	
7,266,972	B2	9/2007	Anselmino et al.	
7,284,390	B2	10/2007	Van Meter et al.	
7,591,141	B2	9/2009	Wetekamp et al.	
7,870,754	B2	1/2011	Martin et al.	
8,117,863	B2	2/2012	Van Meter et al.	
2006/0086128	A1	4/2006	Maglinger et al.	
2006/0086129	A1	4/2006	Anselmino et al.	
2006/0086130	A1	4/2006	Anselmino et al.	
2006/0086131	A1	4/2006	Pastryk et al.	
2006/0086132	A1	4/2006	Maglinger et al.	
2006/0201189	A1	9/2006	Adamski et al.	
2006/0266055	A1	11/2006	Anderson et al.	
2007/0245762	A1	10/2007	Maglinger et al.	
2008/0011010	A1	1/2008	Koons et al.	
2008/0016900	A1	1/2008	Bippus et al.	
2008/0041090	A1	2/2008	Lee et al.	
2008/0134709	A1	6/2008	Fischer et al.	
2008/0168794	A1	7/2008	Cho et al.	
2008/0289355	A1	11/2008	Kang et al.	
2009/0038330	A1	2/2009	Lee et al.	
2009/0064703	A1	3/2009	Kim et al.	
2009/0064704	A1	3/2009	Wu et al.	
2009/0173098	A1	7/2009	Kim et al.	
2009/0255289	A1	10/2009	Friedmann et al.	
2010/0037631	A1	2/2010	Choi et al.	
2010/0050677	A1	3/2010	Lu et al.	
2010/0050681	A1	3/2010	Ryu et al.	
2010/0058796	A1	3/2010	Kim	
2010/0077789	A1	4/2010	Lim et al.	
2010/0199701	A1	8/2010	Yoon et al.	
2010/0257887	A1	10/2010	Hwang	
2010/0287970	A1	11/2010	Choi	

FOREIGN PATENT DOCUMENTS

JP	49-77571	B	7/1974
JP	51-21165		2/1976
JP	56-47453		4/1981
JP	2-29589	A	1/1990
JP	2-103382	A	4/1990
JP	4-15477	A	1/1992
JP	4-222378	A	8/1992
JP	5-10660	A	1/1993
JP	5-66084	A	3/1993
JP	5-71849	A	3/1993
JP	5-79367	U	10/1993
JP	6-11228	A	1/1994
JP	6-147743	A	5/1994
JP	7-19701	A	1/1995
JP	7-174453	A	7/1995
JP	7-294115	A	11/1995
JP	7-301479	A	11/1995
JP	7-305946	A	11/1995
JP	8-61824	A	3/1996
JP	8-271110	A	10/1996
JP	9-145210	A	6/1997
JP	9-303944	A	11/1997
JP	11-101544	A	4/1999
JP	11-211308	A	8/1999
JP	2000-9372	A	1/2000
JP	2000-111229	A	4/2000
JP	2000-161830	A	6/2000
JP	2000-266458	A	9/2000
JP	2000-337760	A	12/2000
JP	2001-116410	A	4/2001
JP	2001-349657	A	12/2001
JP	2002-139271	A	5/2002
JP	2002-181429	A	6/2002
JP	2003-10896	A	1/2003
JP	2003-114075	A	4/2003
JP	2003-121043	A	4/2003
JP	2003-262438	A	9/2003
JP	2004-53092	A	2/2004
JP	3545617	B2	4/2004
JP	2006105418	A2	4/2006
JP	4032673	B2	11/2007
KR	1988-0000896	A	3/1988
KR	1994-0011915	A	6/1994
KR	95-25387	A	9/1995
KR	1996-0018479	A	6/1996
KR	1997-0059690	A	8/1997
KR	1999-001784	A	1/1999
KR	1999-007058	A	1/1999
KR	1999-0156726	B1	1/1999
KR	1999-0034649	A	5/1999
KR	1999-0182534	B1	5/1999
KR	1999-0021510	U	6/1999
KR	1999-0031599	U	7/1999
KR	1999-0056269	A	7/1999
KR	200164305	Y1	10/1999
KR	20-0256596	Y1	12/2001
KR	10-0356542	B1	10/2002
KR	2003-0018246	A	3/2003
KR	2003-0030961	A	4/2003
KR	2003-0092871	A	12/2003
KR	30-0355715	S	7/2004
KR	2004-00571587	A	7/2004
KR	2004-0102570	A	12/2004
KR	2005-0023863	A	3/2005
KR	2005-0028227	A	3/2005
KR	2005-0028656	A	3/2005
KR	2005-0028657	A	3/2005
KR	2005-0028658	A	3/2005
KR	2005-0094673	A	9/2005
KR	2005-0117536	A	12/2005
WO	WO2008/135473	A2	11/2008

OTHER PUBLICATIONS

JP 2-103382, Matsushita Refrig Co Ltd—English Translation.
JP 6-147743, Hitachi Ltd—English Translation.
JP 9-145210, Mitsubishi Electric Corp—English Translation.
JP 9-303944, Sanyo Electric Co Ltd—English Translation.
JP 2000-9372, Toshiba Corp—English Translation.
JP 2000-111229—English Translation.
JP 2003-121043—English Translation.
KR 95-25387, Samsung Electronics Co., Ltd.—English Translation.
KR 1999-001784, Samsung Electronics Co., Ltd.—English Translation.
KR 1999-0021510, Daewoo Electronics Co., Ltd.—English Translation.
KR 1999-0182534, Samsung Electronics Co., Ltd.—English Translation.
KR 10-0356542, Samsung Electronics Co., Ltd.—English Translation.
KR 2003-0018246, LG Electronics, Inc.—English Translation.
KR 2003-0030961—English Translation.
KR 2003-0092871—English Translation.
KR 2004-0102570, LG Electronics Inc.—English Translation.
KR 2005-0028656, LG Electronics Inc.—English Translation.

* cited by examiner

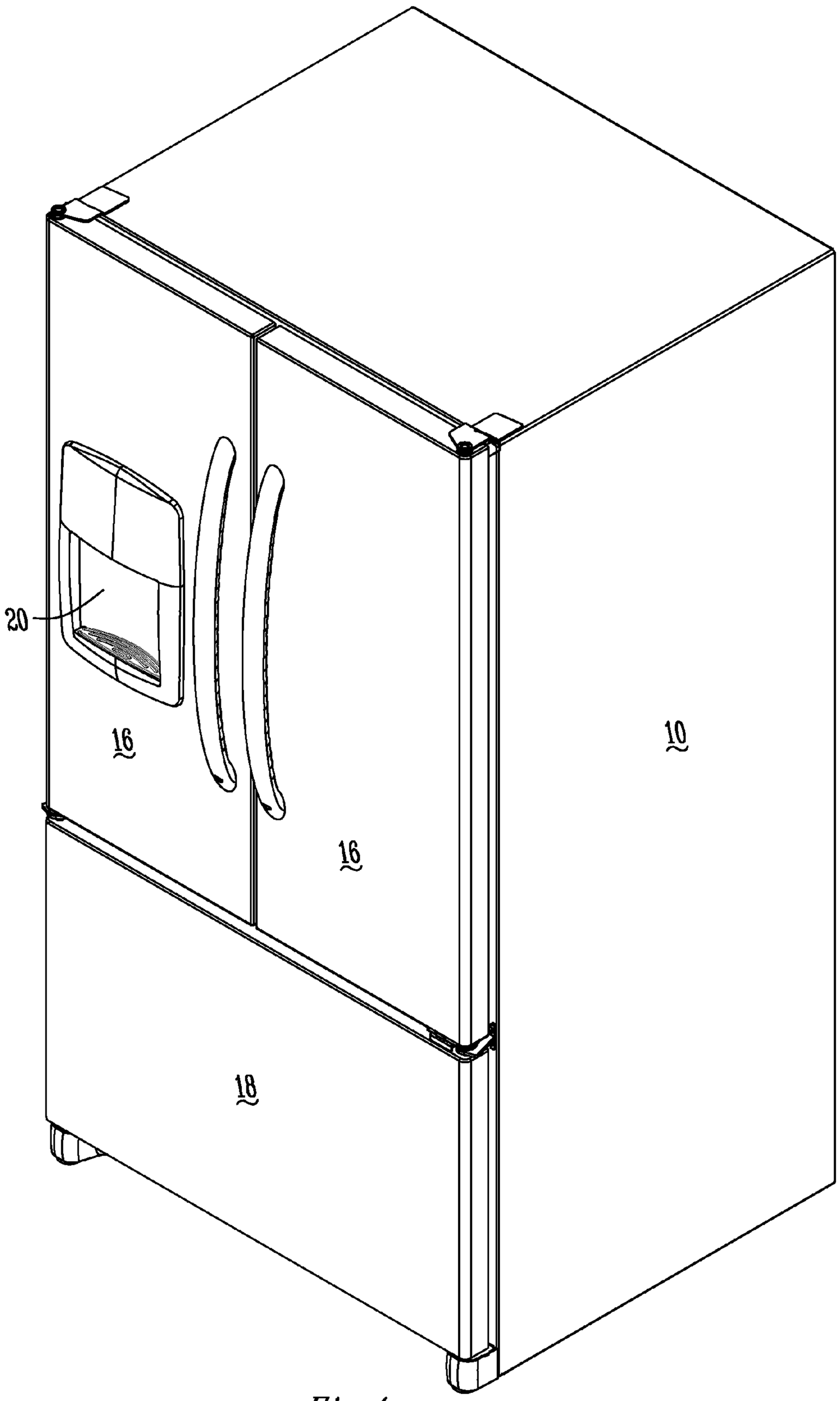


Fig. 1

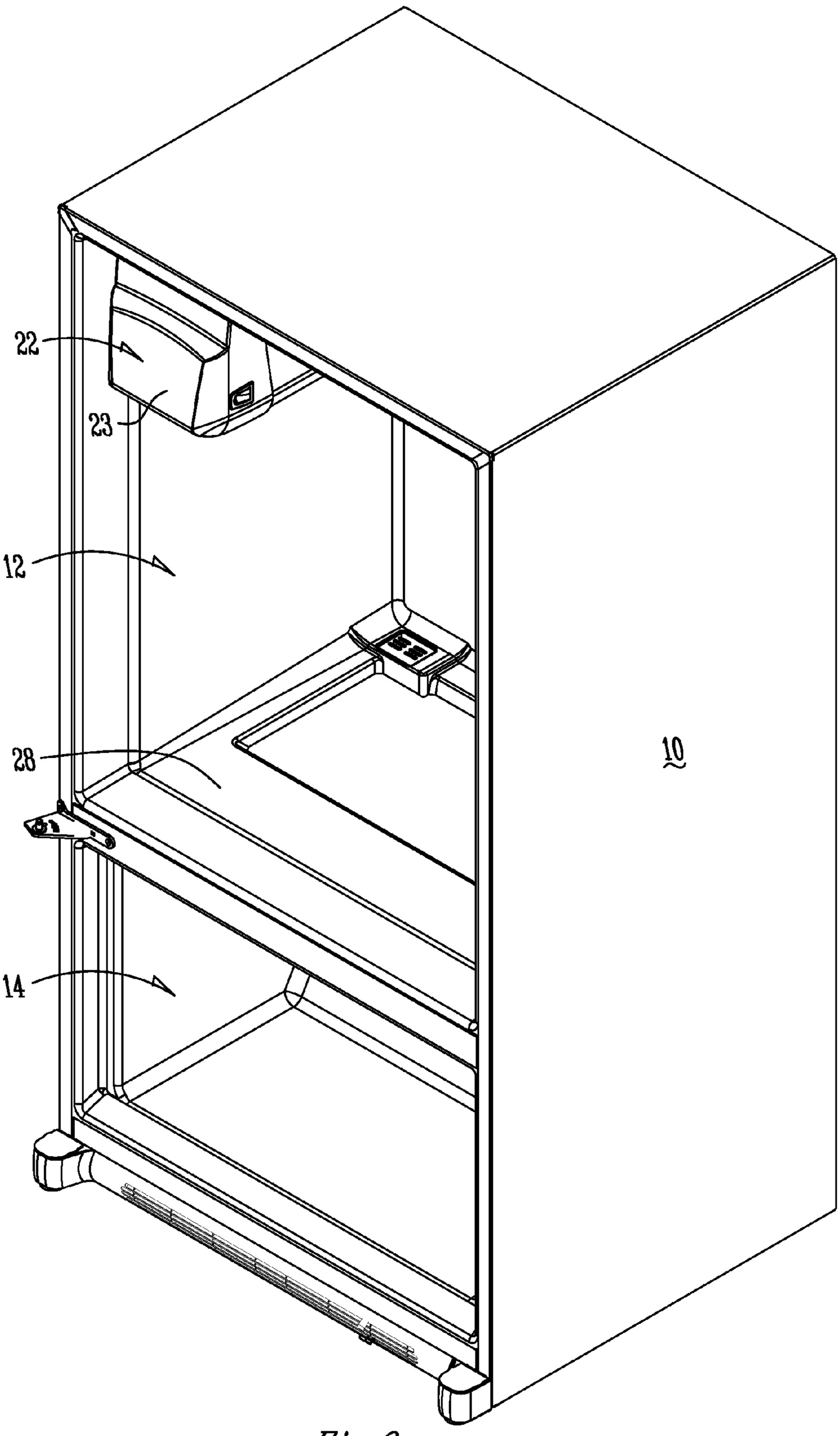


Fig. 2

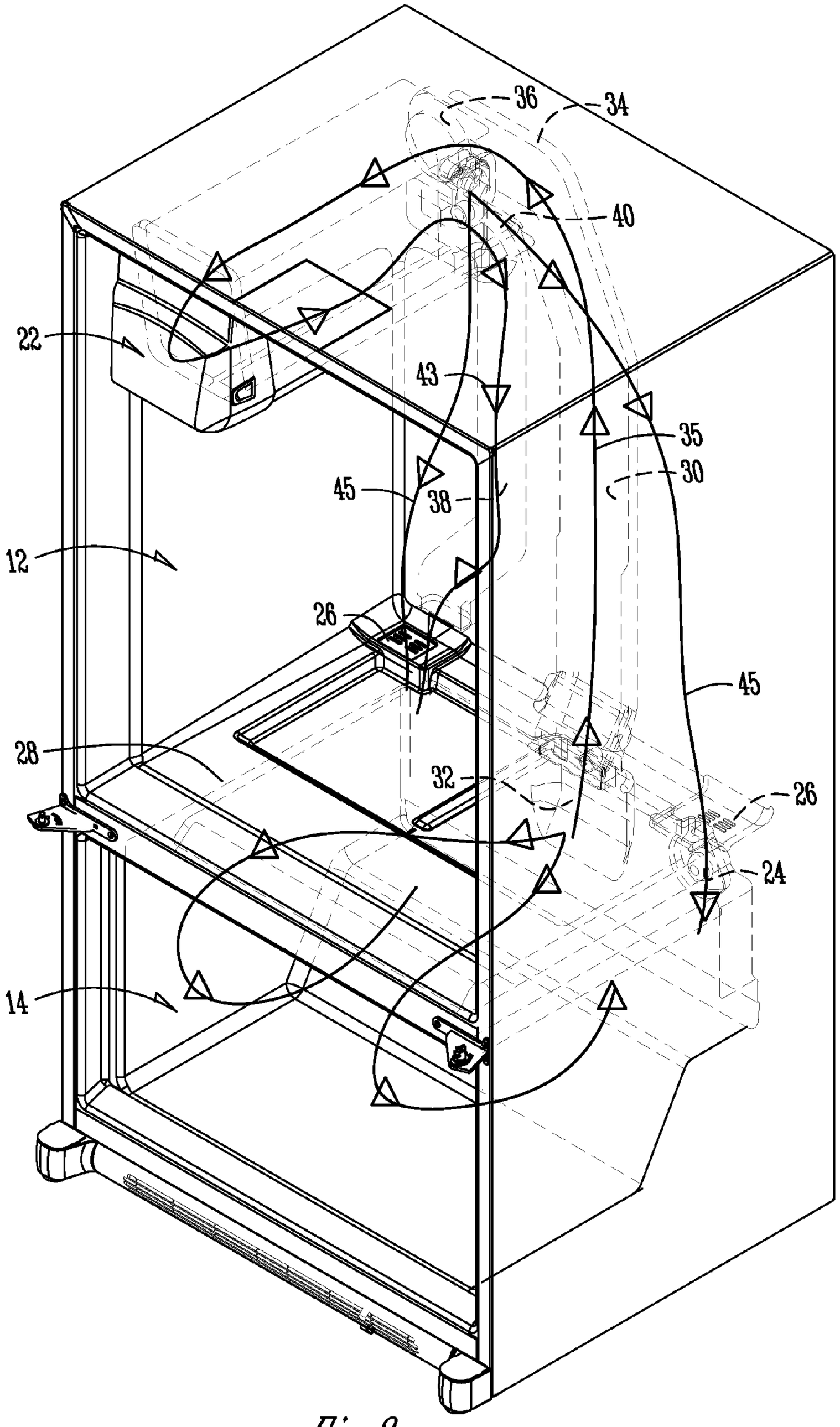


Fig. 3

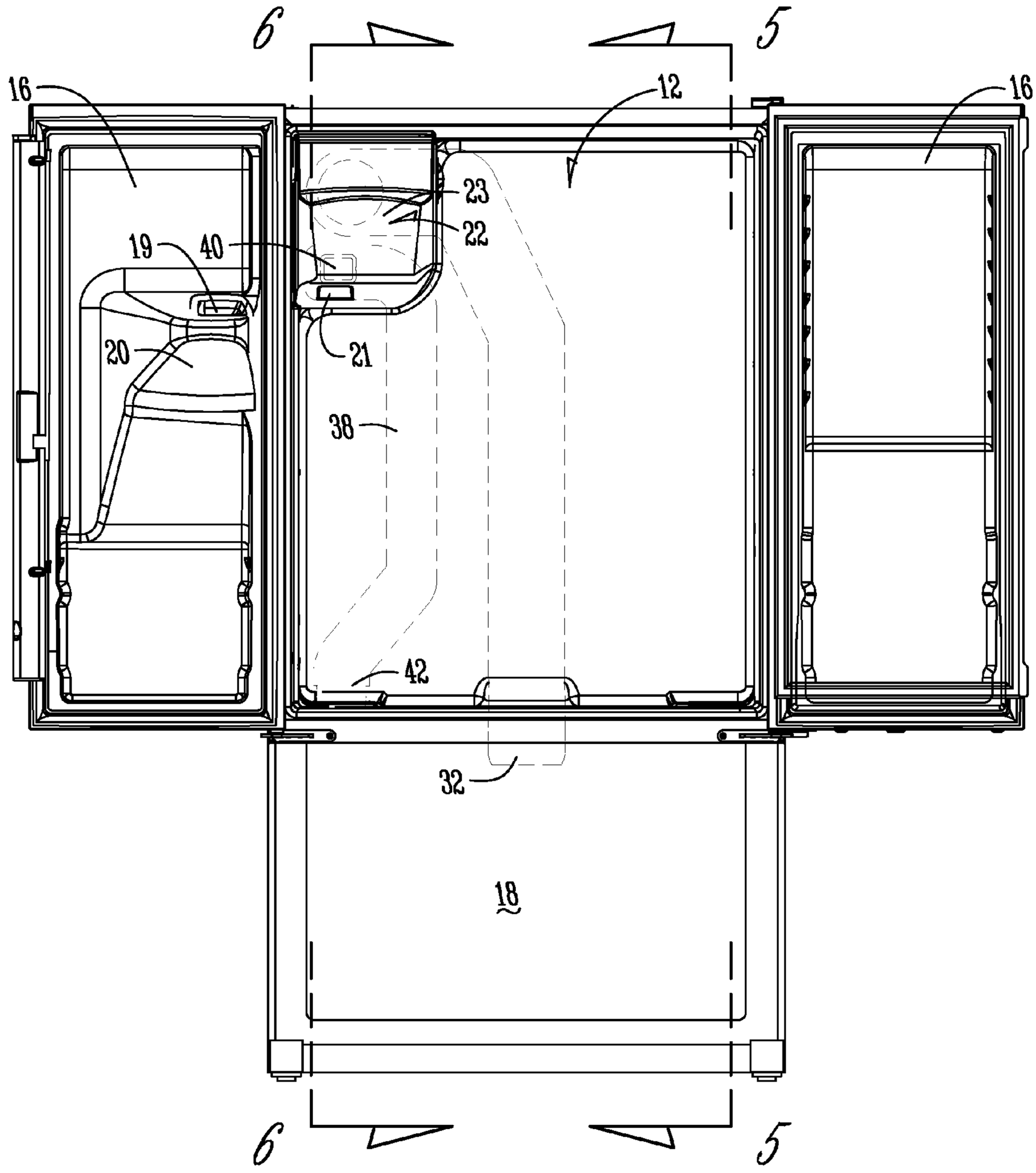


Fig. 4

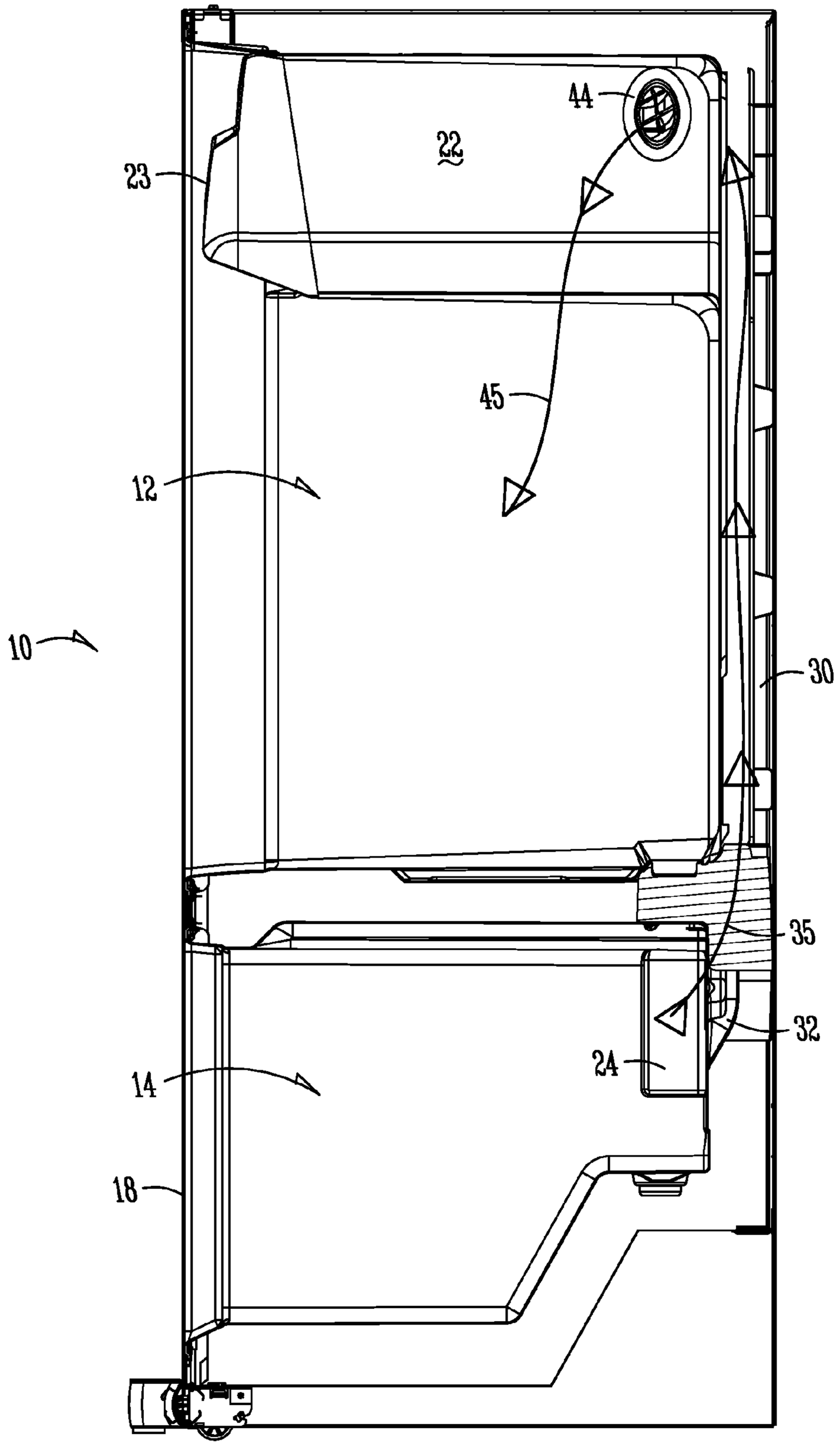


Fig. 5

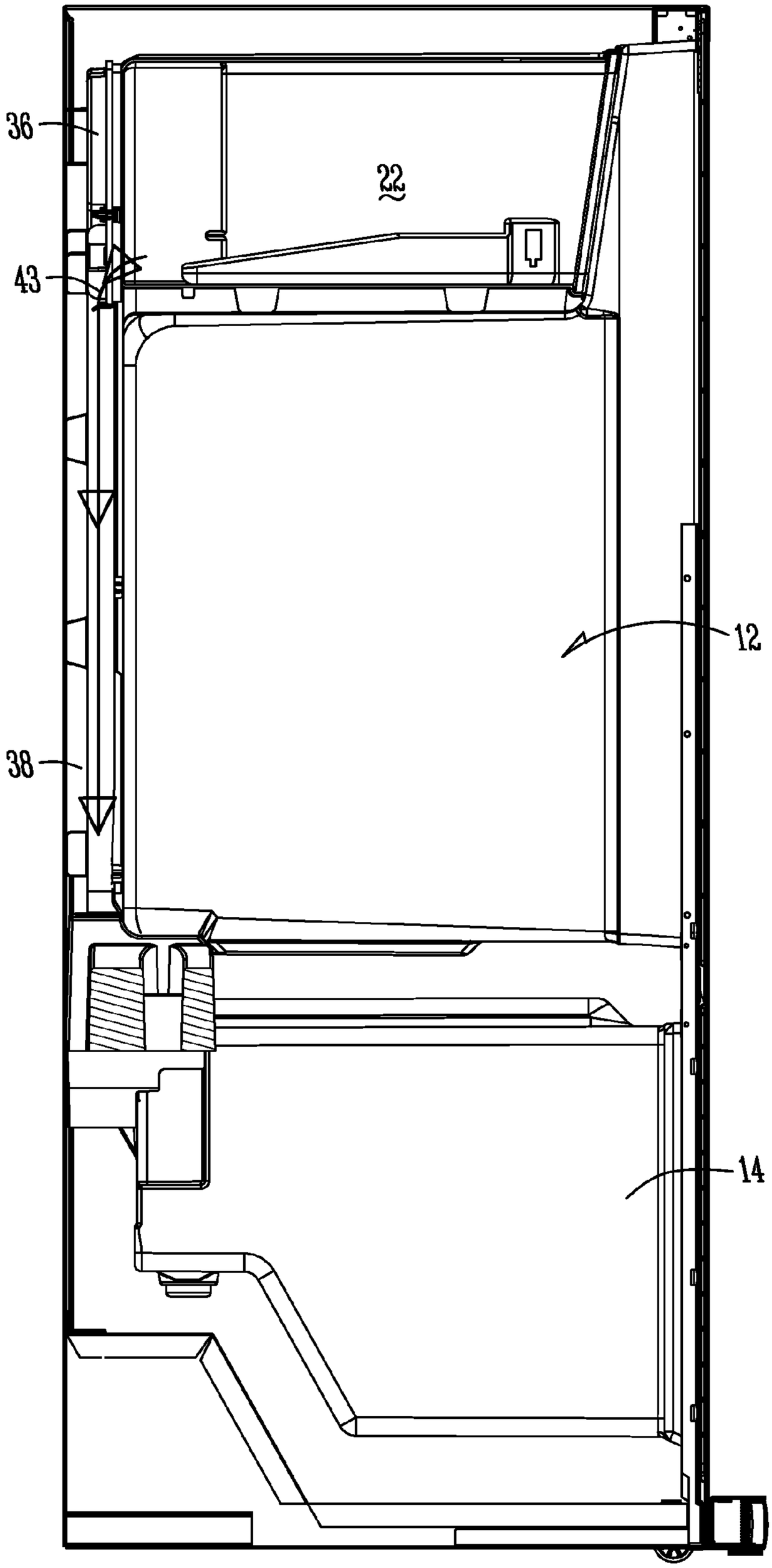


Fig. 6

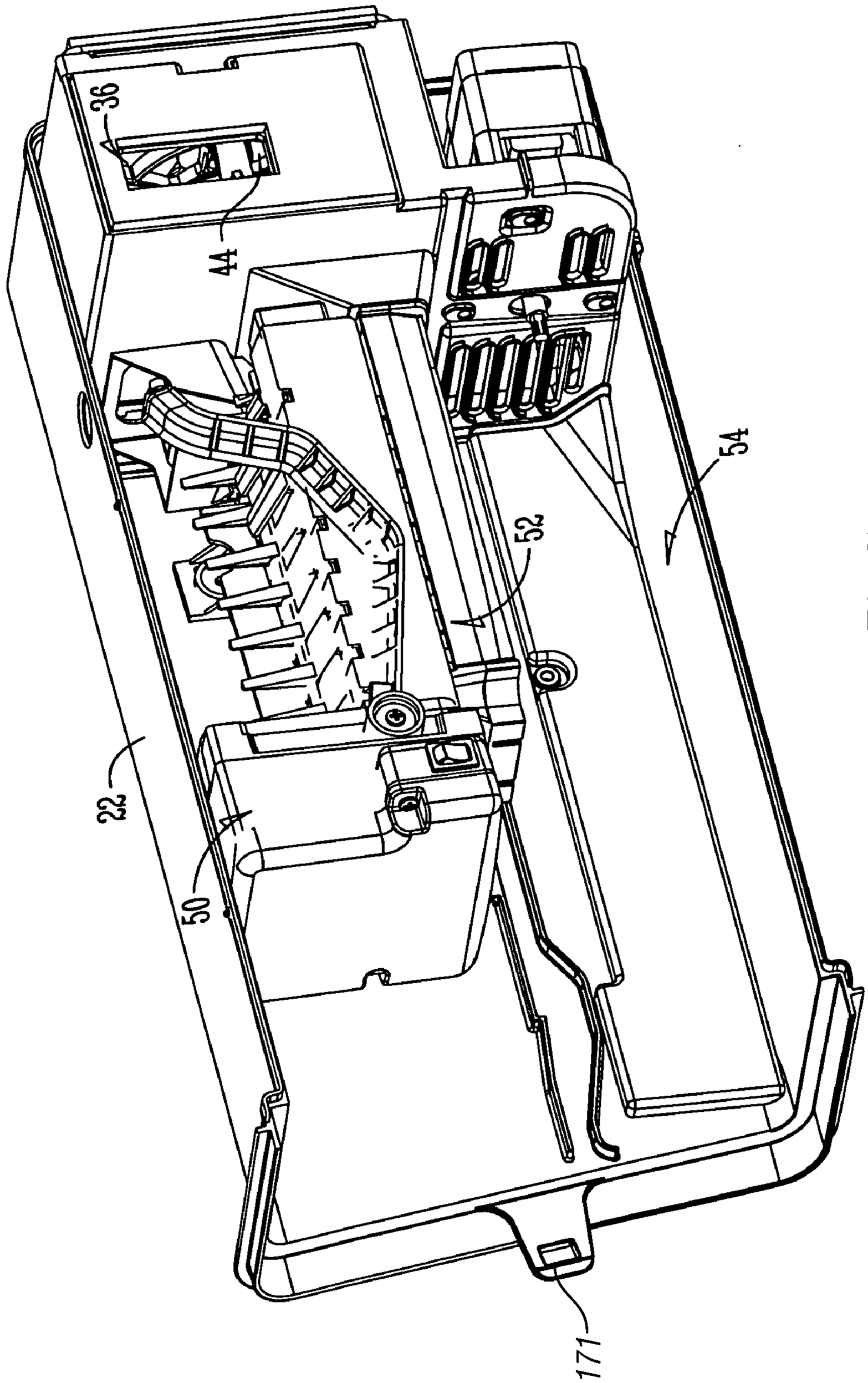


Fig. 7

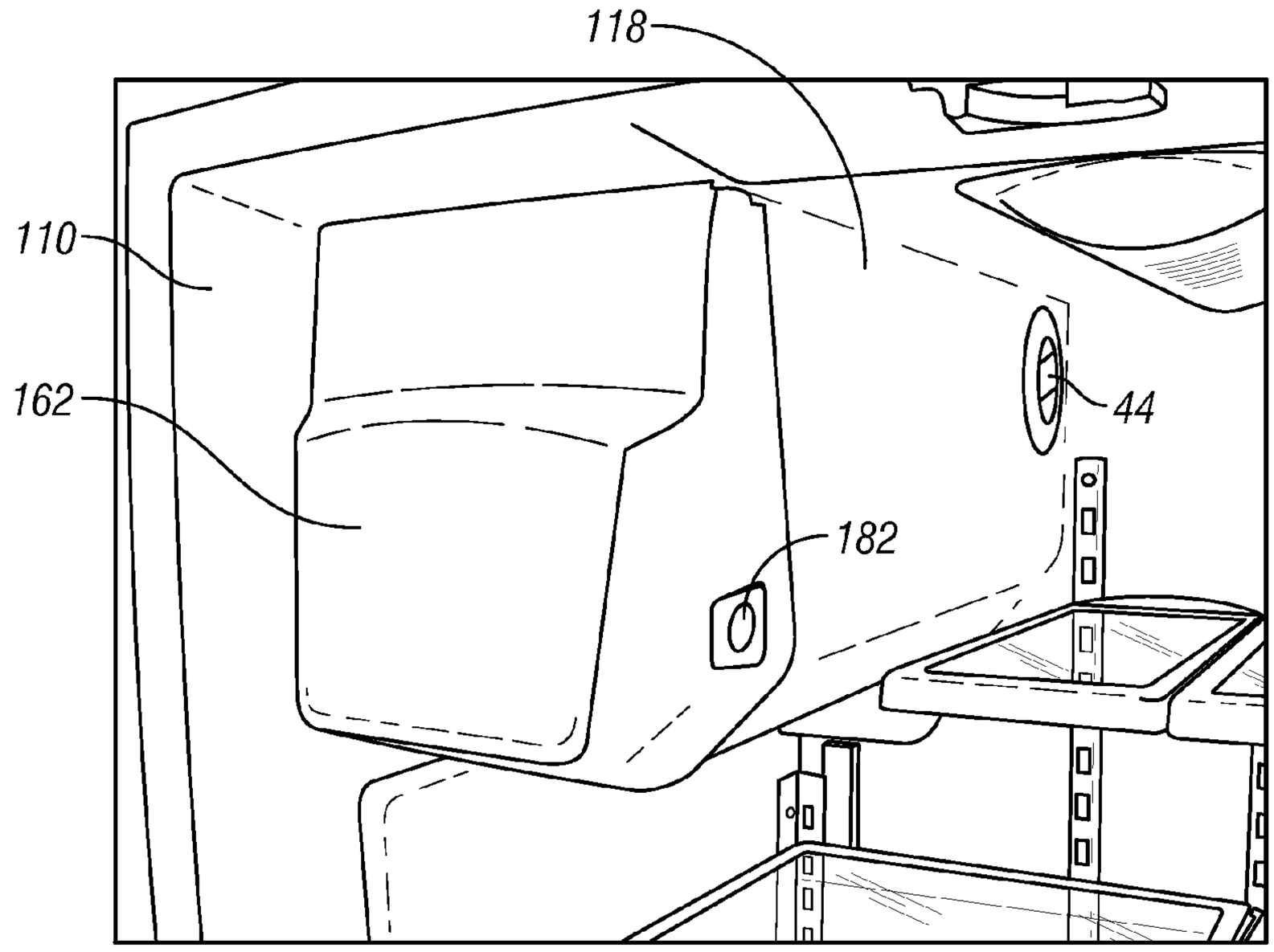


FIG. 8

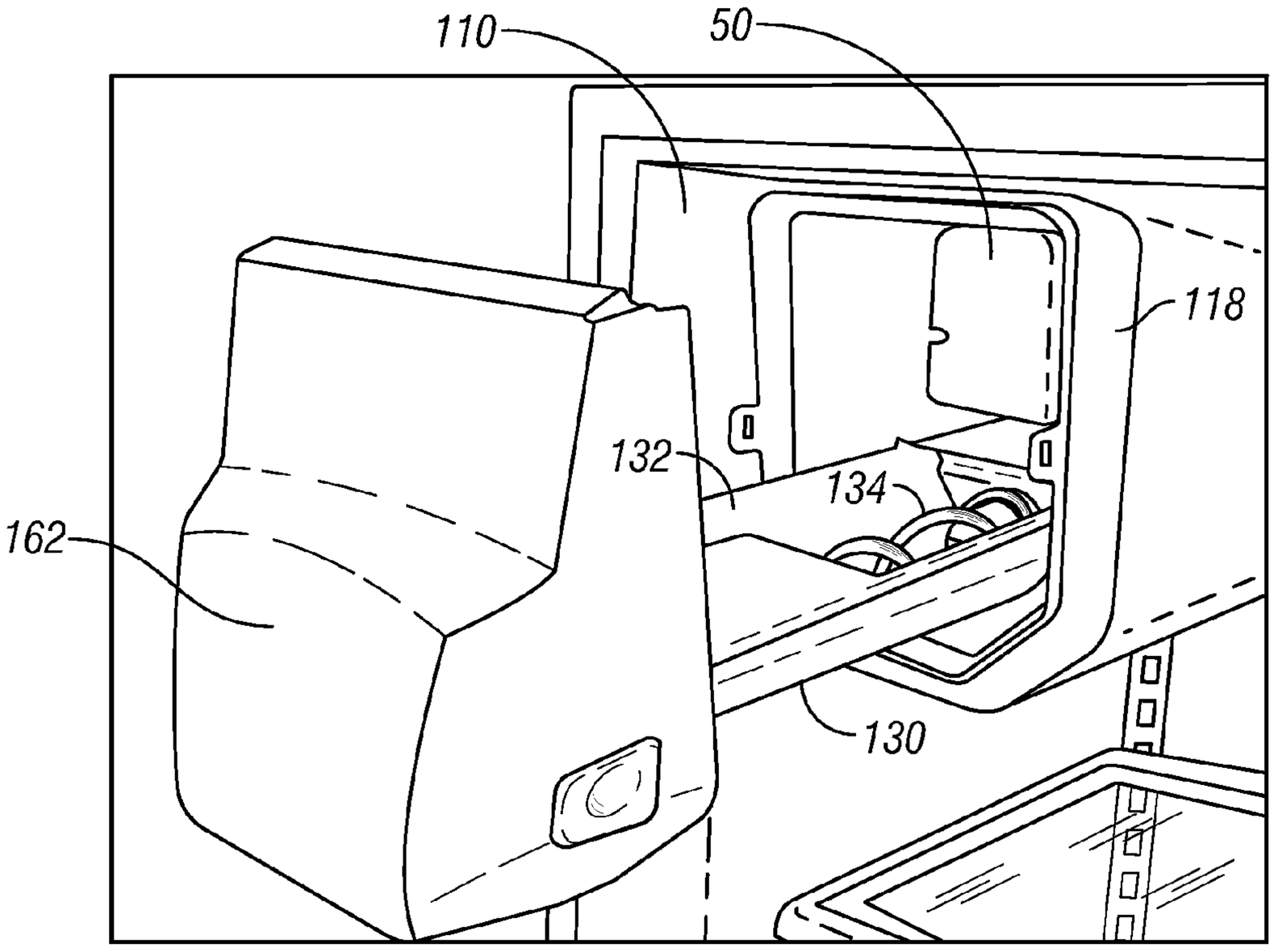


FIG. 9

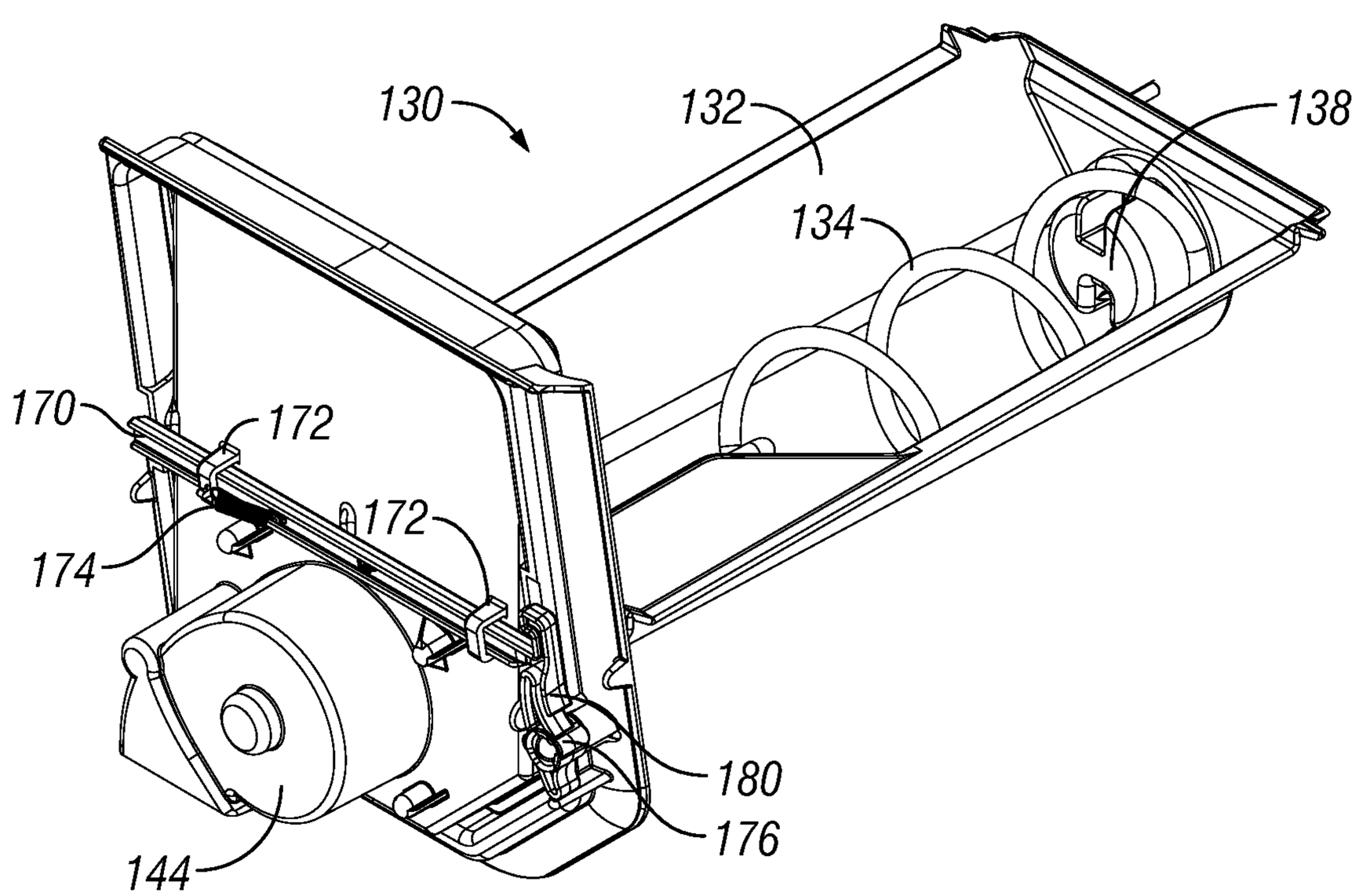


FIG. 10

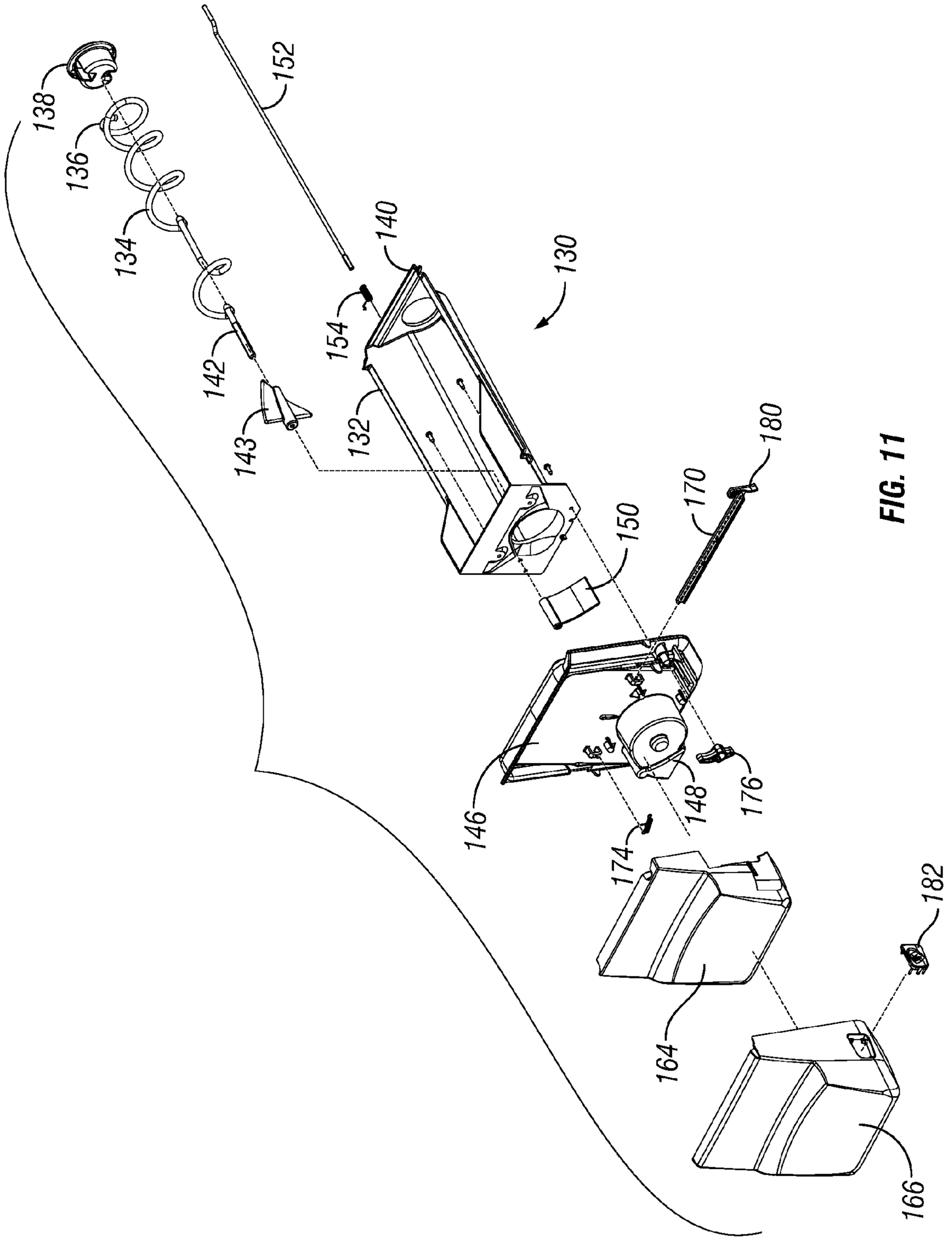

138
136
134
152
140
142
143
154
132
130
150
170
180
146
148
176
174
182
164
166

FIG. 11

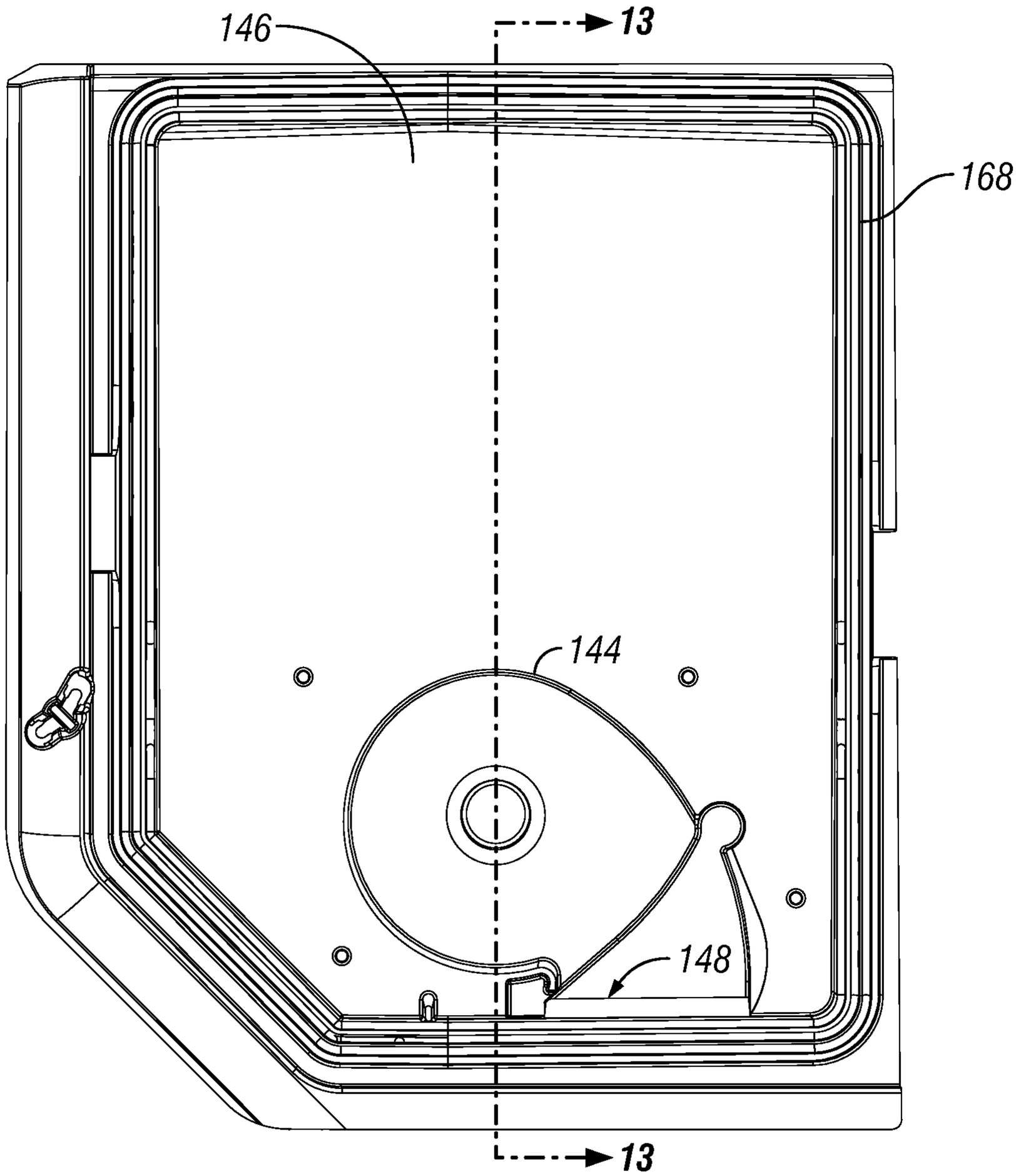


FIG. 12

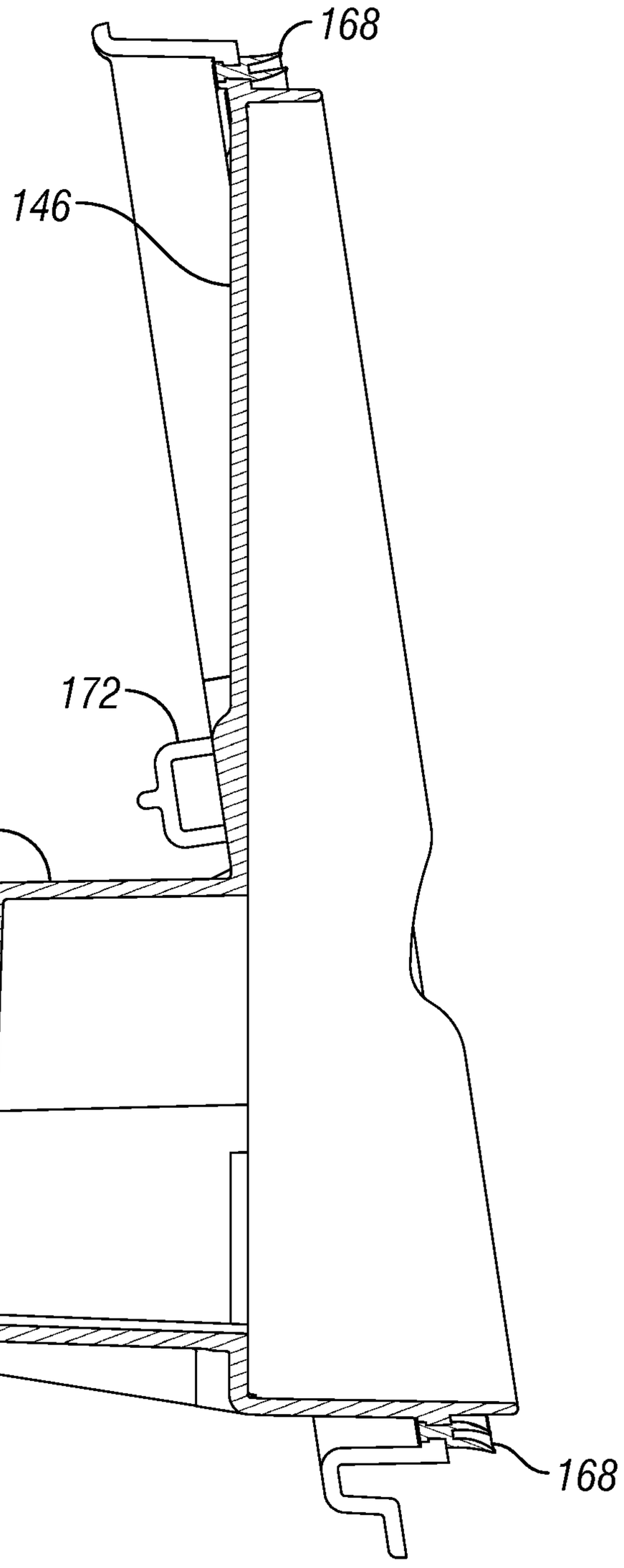


FIG. 13

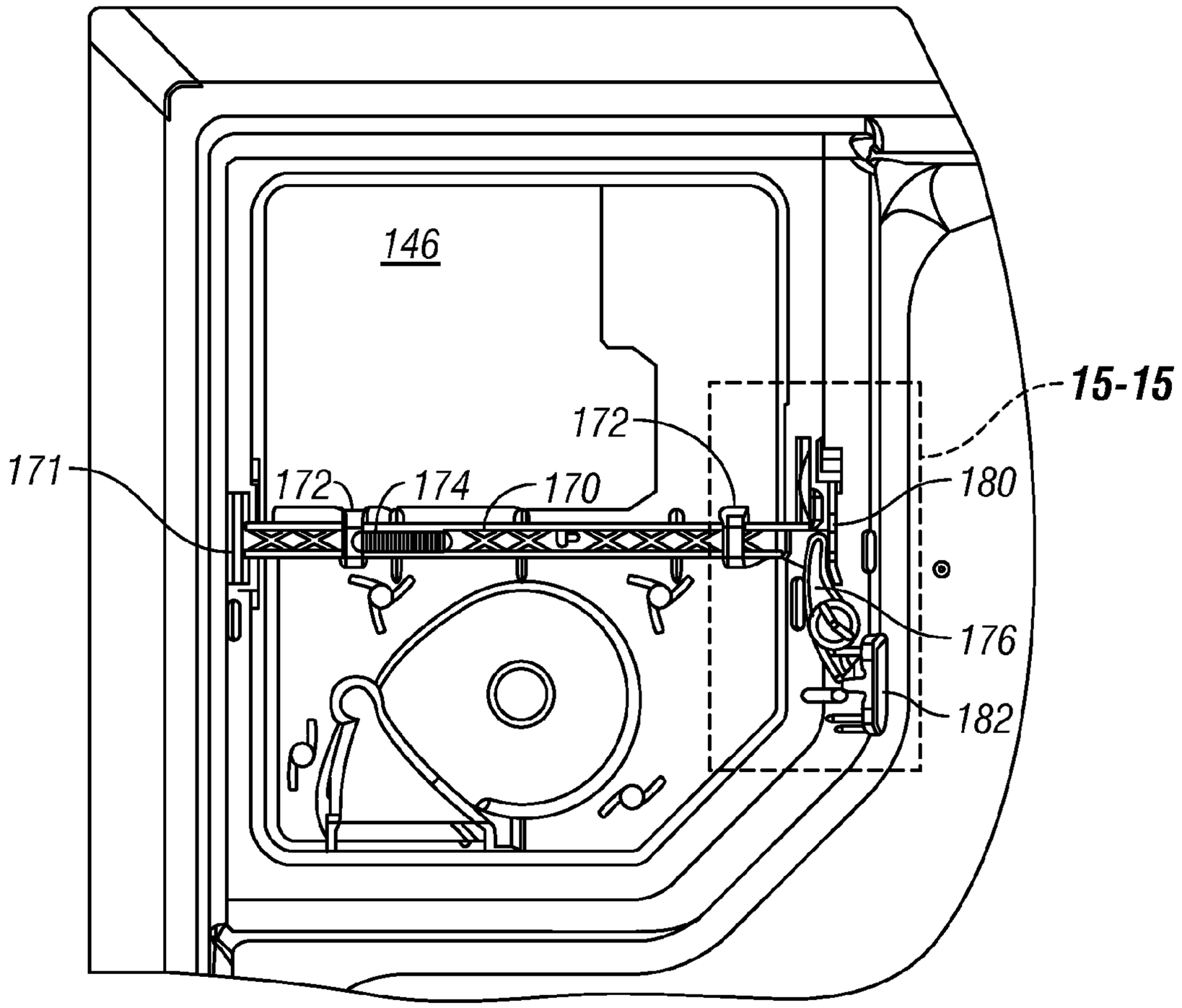
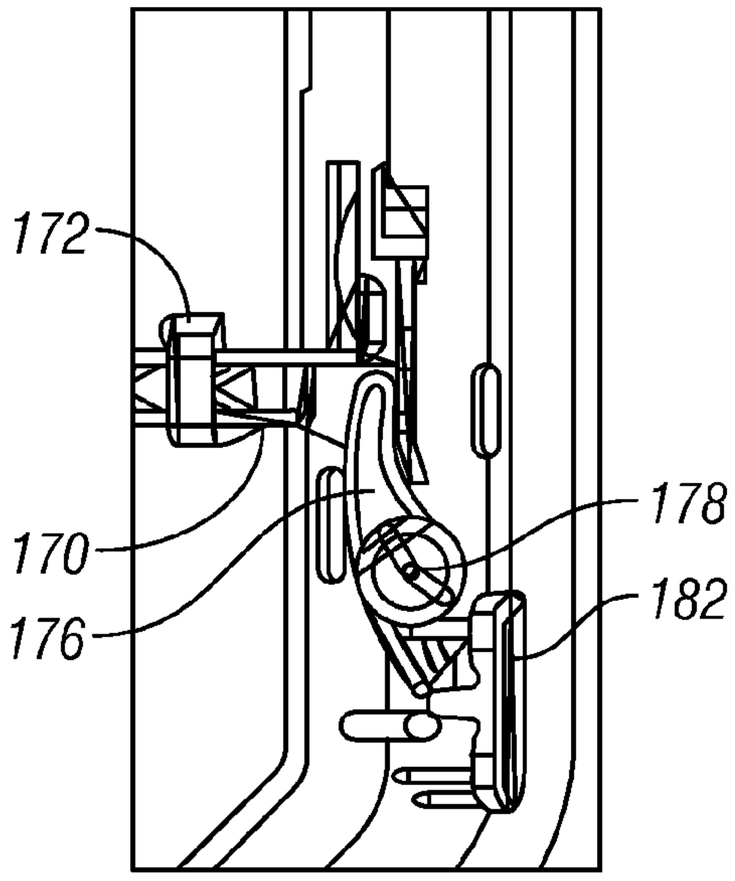


FIG. 14

FIG. 15



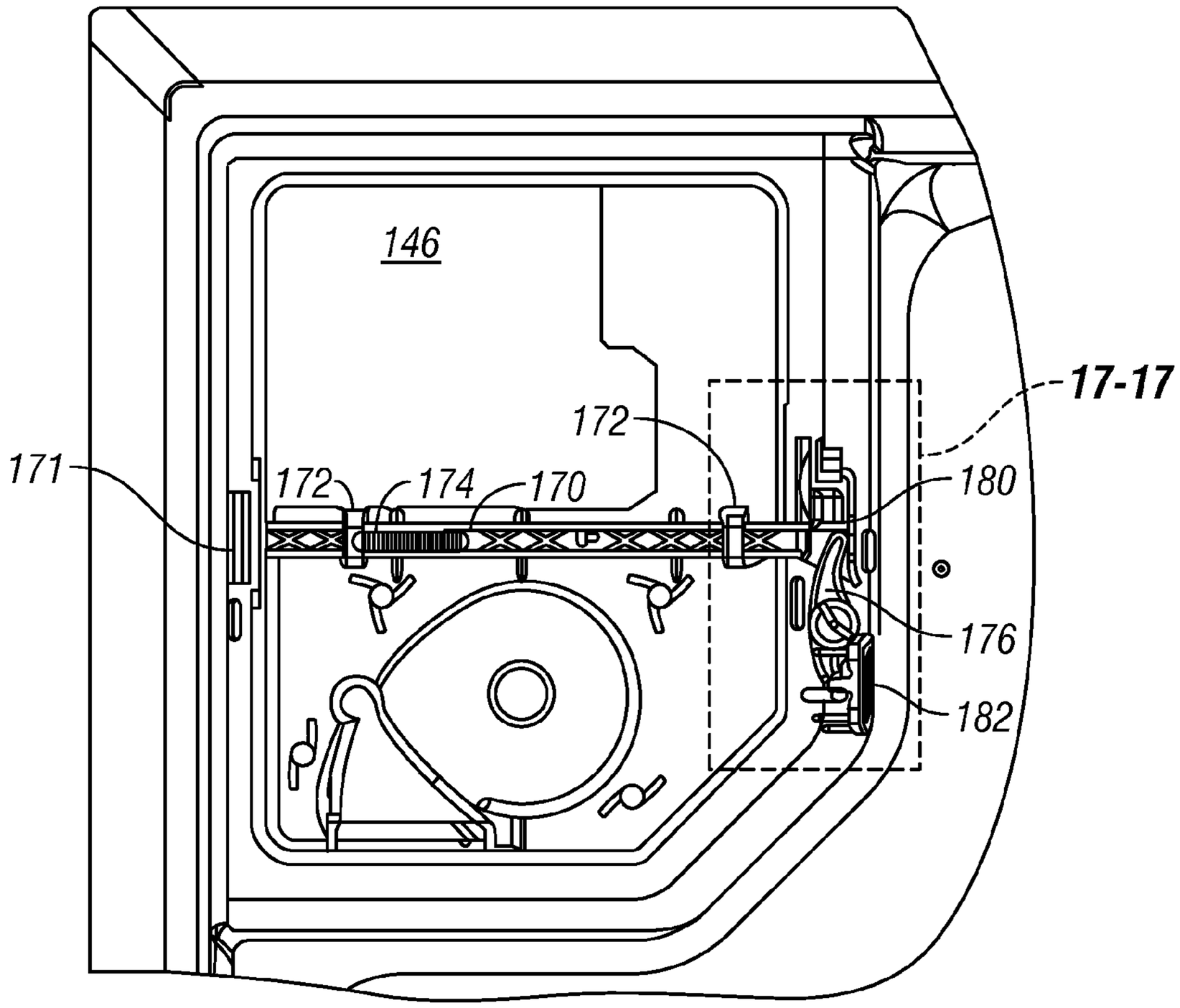


FIG. 16

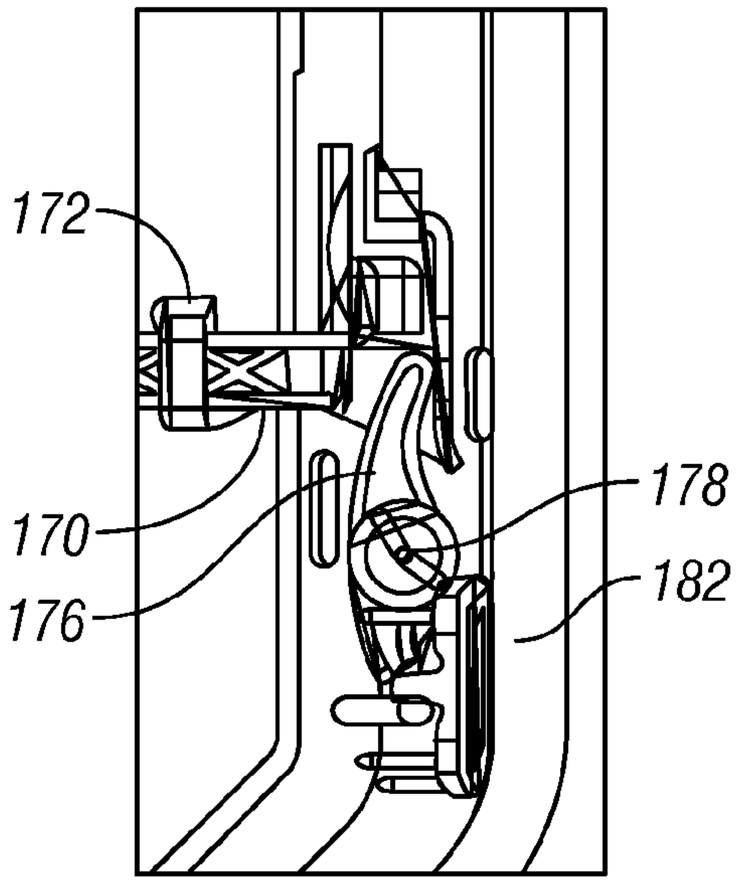


FIG. 17

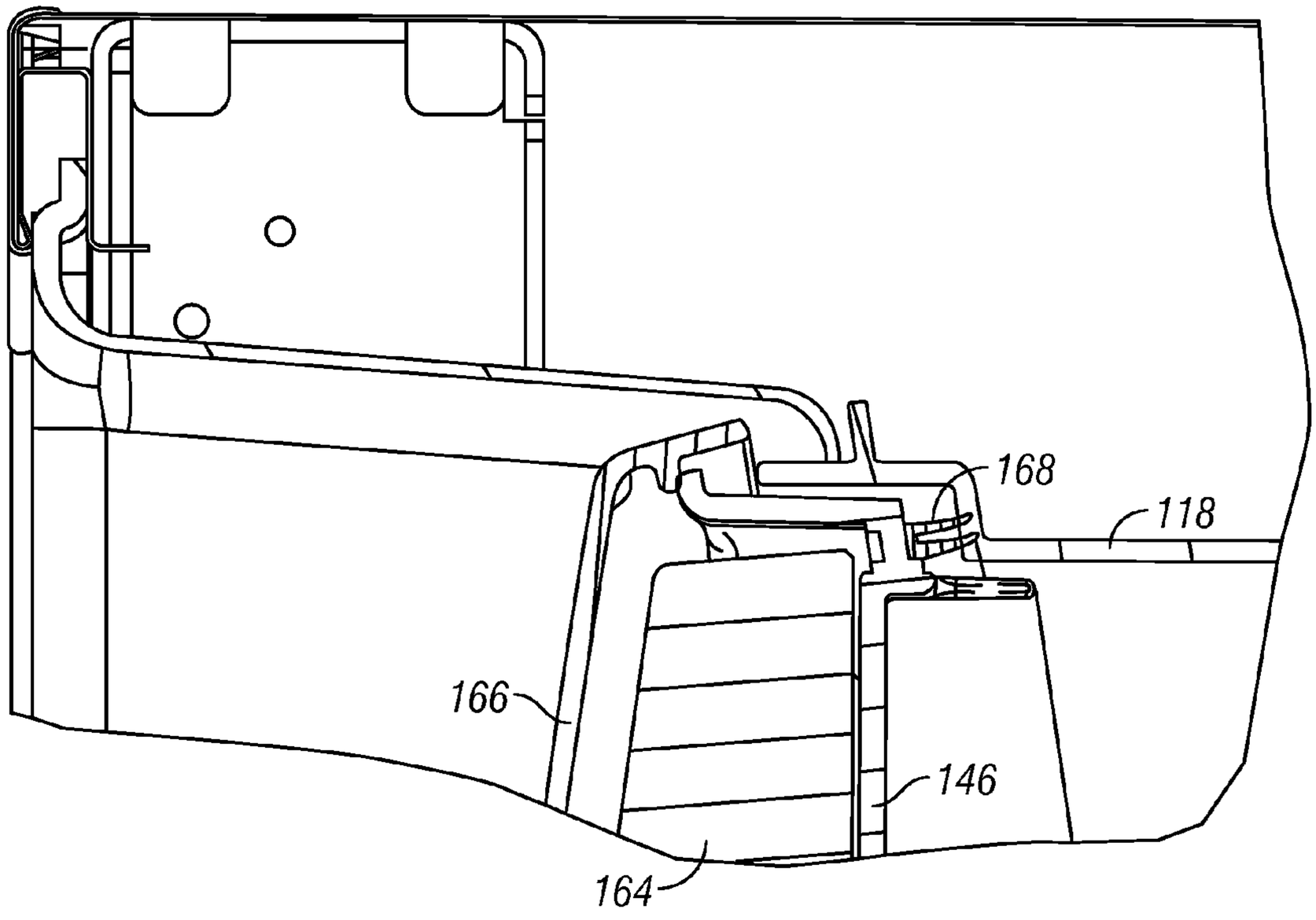


FIG. 18

REFRIGERATOR ICE COMPARTMENT LATCH AND COVER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 12/694,307 filed Jan. 27, 2010, entitled REFRIGERATOR ICE COMPARTMENT LATCH AND COVER, which is a continuation of U.S. application Ser. No. 11/331,883 filed Jan. 13, 2006, entitled REFRIGERATOR ICE COMPARTMENT LATCH AND SEAL, now issued as U.S. Pat. No. 7,726,148, which is a continuation-in-part application of U.S. application Ser. No. 11/139,237, filed May 27, 2005, entitled INSULATED ICE COMPARTMENT FOR BOTTOM MOUNT REFRIGERATOR, now issued as U.S. Pat. No. 7,337,620, which is a continuation-in-part of and U.S. application Ser. No. 11/131,701, filed May 18, 2005, entitled REFRIGERATOR WITH INTERMEDIATE TEMPERATURE ICEMAKING COMPARTMENT, now issued as U.S. Pat. No. 7,284,390, all of which are herein incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

Household refrigerators generally come in three structural styles: (1) a side-by-side model wherein the freezer and refrigerator compartments are side by side; (2) a top mount model wherein the freezer compartment is located above the refrigerator compartment; and (3) a bottom mount model wherein the freezer compartment is mounted below the refrigerator compartment. An icemaker is normally provided in the freezer compartment of all three models. A door mounted ice dispenser is often provided in a side-by-side refrigerator and in a top mount refrigerator so that a person can add ice to a glass without opening the freezer or refrigerator door. However, a door mounted ice dispenser normally is not been provided in bottom mount refrigerators, since the freezer door is too low, and there are difficulties in transporting ice from the freezer compartment to the refrigerator compartment which precludes a dispenser in the refrigerator compartment door. However, it is desirable to have an ice dispenser in the refrigerator compartment of a bottom mount refrigerator.

Providing an icemaking compartment within the fresh food compartment of a refrigerator presents numerous issues, both structural and functional. For example, the fresh food compartment is normally about 40° F., while an ice compartment needs to be less than 32° F. in order to make ice effectively and efficiently and is typically at, or about 0° F. Maintaining and controlling the temperature within the icemaking compartment requires insulation, seals, appropriate airflow, and a control system. Placing the icemaking compartment within the fresh food compartment of the refrigerator also requires consideration of electrical connections of the icemaker and the supply of water to the icemaker. The method of manufacturing of such an icemaking compartment within the fresh food compartment of a refrigerator also raises novel and unique considerations which are not factors for an icemaking compartment mounted in a freezer.

U.S. Pat. No. 6,735,959 issued to Najewicz discloses a thermoelectric icemaker placed within the fresh food compartment of a bottom mount refrigerator that may be dispensed through the fresh food door. Najewicz forms ice within the fresh food compartment using the thermoelectric icemaker even though the compartment is above a freezing temperature. Although Najewicz provides for a duct that runs from the freezer compartment to the thermoelectric icemaker, the cold air from the duct is used to remove heat from the thermoelectric icemaker. Najewicz has many problems that must be overcome in order to be practical including the removal of unfrozen water, rapid ice body formation, prolonged ice storage, etc. The present invention overcomes these problems.

SUMMARY OF THE INVENTION

Therefore it is a primary object, feature, or advantage of the present invention to improve over the state of the art.

A further object, feature, or advantage of the present invention is the provision of an improved refrigerator having an icemaking compartment within the fresh food compartment.

Another object, feature, or advantage of the present invention is the provision of a refrigerator having a separate icemaking compartment maintained at a temperature between 0° and 32° F.

A further object, feature, or advantage of the present invention is the provision of a refrigerator having an insulated icemaking compartment remote from the freezer compartment.

A further object, feature, or advantage of the present invention is the provision of a bottom mount refrigerator having an icemaking compartment in the fresh food compartment, and having an insulated and sealed front cover on the icemaking compartment which can be opened to provide access into the compartment.

A further object, feature, or advantage of the present invention is the provision of an icemaking compartment which is formed separately from and mounted into a fresh food compartment of a bottom mount refrigerator.

Another object, feature, or advantage of the present invention is the provision of a method of making a bottom mount refrigerator having an integral ice compartment formed in the liner of the fresh food compartment.

Still another object, feature, or advantage of the present invention is the provision of a control system for an ice compartment within the fresh food compartment of a refrigerator for controlling icemaking and dispensing.

Another object, feature, or advantage of the present invention is the provision of an icemaker in the refrigerator compartment of a bottom mount refrigerator, with a cold air duct to provide air from the freezer compartment to the icemaker.

Still another object, feature, or advantage of the present invention is the provision of an icemaker in the refrigerator compartment of a bottom mount refrigerator having efficient and timely icemaking capacity.

It is a still further object, feature, or advantage of the present invention to provide a refrigerator that is energy efficient.

Another object, feature, or advantage of the present invention is to provide a refrigerator that enhances safety.

Yet another object, feature, or advantage of the present invention is to provide a refrigerator that provides convenience to users.

A further object, feature, or advantage of the present invention is to provide a refrigerator that is aesthetically pleasing to users.

A still further object, feature, or advantage of the present invention is to provide a refrigerator with a control system design that minimizes the complexity and the number of components necessary.

One or more of these and/or other objects, features, or advantages of the present invention will become from the specification and claims that follow.

The bottom mount refrigerator of the present invention has an icemaker within an insulated icemaking compartment in the fresh food or refrigerator compartment. Cold air is supplied to the icemaking compartment from the freezer compartment via a cold air duct. A return air duct extends from the icemaking compartment to the freezer compartment. The icemaking compartment also includes a vent opening for venting air to the refrigerator compartment. A fan draws or forces air through the duct from the freezer compartment to the icemaking compartment. The temperature in the ice making compartment is between 0° F. to 32° F., which is colder than the temperature of the refrigerator compartment, but not as cold as the freezer compartment. The icemaking compartment is preferably located in an upper corner of the refrigerator compartment. The door of the refrigerator compartment includes an ice dispenser to supply ice to a person without opening the refrigerator compartment door. An ice bin for storing ice is removably mounted in the ice compartment.

Preferably, the icemaking compartment is formed integrally with the liner of the fresh food compartment. Alternatively, the icemaking compartment is formed separately from and mounted in the fresh food compartment. The icemaking compartment includes inner and outer shells, with insulation therebetween. An insulated front cover for the ice bin has a latch and seal which provide an air-tight seal with the icemaking compartment when the latch is locked. The latch can be unlocked to allow removal of the ice bin and to provide access to the icemaker.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a bottom mount refrigerator according to the present invention.

FIG. **2** is a perspective view of the bottom mount refrigerator having the doors removed.

FIG. **3** is a view similar to FIG. **2** showing the cold air duct and return air duct for the icemaking compartment.

FIG. **4** is a front elevation view of the bottom mount refrigerator of the present invention with the doors open, and illustrating the cold air and return air ducts.

FIG. **5** is a sectional view taken along lines **5-5** of FIG. **4**.

FIG. **6** is a sectional view taken along lines **6-6** of FIG. **4**.

FIG. **7** is a perspective view of the icemaker positioned within the icemaking compartment.

FIG. **8** is a perspective view from the front of the icemaker showing the bin and front cover in a closed position.

FIG. **9** is a view similar to FIG. **14** showing the bin and front cover in an open position.

FIG. **10** is a perspective view of the ice pan, auger and motor assembly.

FIG. **11** is an exploded view of the ice pan, auger and motor assembly.

FIG. **12** is a rear elevation view of the bin assembly seal for the icemaking compartment.

FIG. **13** is a sectional view taken along lines **25-25** of FIG. **12**.

FIG. **14** is an elevation view of the ice bin assembly latch in the locked position.

FIG. **15** is an enlarged view taken along lines **15-15** of FIG. **14**.

FIG. **16** is an elevation view of the ice bin assembly latch in the unlocked position.

FIG. **17** is an enlarged view taken along lines **17-17** of FIG. **16**.

FIG. **18** is an enlarged partial view of the ice bin assembly seal.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A bottom mount refrigerator is generally designated in the drawings by the reference numeral **10**. The refrigerator **10** includes a refrigerator or fresh food compartment **12** and a freezer compartment **14**. Doors **16** are provided for the refrigerator compartment or fresh food compartment **12** and a door **18** is provided for the freezer compartment **14**. One of the doors **16** includes an ice dispenser **20**, which may also include a water dispenser.

Intermediate Temperature Icemaking Compartment

An icemaking compartment or intermediate compartment **22** is provided in the refrigerator compartment **12**. The icemaking compartment **22** is shown to be in one of the upper corners of the refrigerator, or fresh food, compartment **12**, but other locations are also within the scope of this invention. The icemaking compartment **22** has a front cover **23** that is insulated to prevent the cold air of the icemaking compartment **22** from passing into the refrigerator compartment and opening **21** is provided that mates with chute **19** of the ice dispenser **20**. A seal may be provided between the opening **21** and chute **19** to prevent cold air from passing from the icemaking compartment to the refrigerator compartment **12**. Chute **19** may be adapted to engage opening **21** upon closing of door **16**. Chute **19** and opening **21** may be opposingly angled as to provide added sealing upon closing of door **16**. Additionally, an intermediate piece may be used to improve the seal be between chute **19** and opening **21**. For example, a resilient seal may be used to assist in achieving this seal. Alternatively, a spring or other elastic material or apparatus may be utilized between or about the junction of chute **19** and opening **21**. Other alternatives for sealing between chute **19** and opening **21** should be evident to one skilled in the art.

Additionally, chute **19** should have a blocking mechanism located within or about it to assist in preventing or decreasing the flow of air or heat transfer within chute **19**. For example, a flipper door that operates by a solenoid may be placed at the opening **21** to prevent cold air from leaving the icemaking compartment **22** and entering into the refrigerator compartment.

Preferably, the icemaking compartment **22** includes an icemaker **50** (as described below) that forms ice in an environment that is below freezing.

The icemaking compartment **22** may be integrally formed adjacent the refrigerator compartment **12** during the liner forming process and insulation filling process. In such a process the intermediate compartment may be separated on at least one side from the fresh food compartment by the refrigerator liner. Alternatively, the icemaking compartment **22** may be made or assembled remotely from the fresh food compartment and installed in the fresh food compartment **12**. For example, this compartment **22** may be slid into the refrigerator compartment **12** on overhead rails (not shown) or other mounting. These methods are discussed subsequently.

The refrigerator **10** includes an evaporator **24** which cools the refrigerator compartment **12** and the freezer compartment **14**. Normally, the refrigerator compartment **12** will be maintained at about 40° F. and the freezer compartment **14** will be maintained at approximately 0° F. The icemaking compartment is maintained at a temperature below 32° F. or less in order to form ice, but is preferably not as cold as the freezer compartment **14**. Preferably this temperature is in the range of 20° F. The walls of the icemaking compartment are insulated

to facilitate temperature control among other aspects. Grates or air vents **26** are provided in the wall **28** between the refrigerator compartment **12** and the freezer compartment **14** to allow air circulation between the compartments.

Air Ducts

A cold air duct **30** extends between the freezer compartment **14** and the icemaking or specialty compartment **22**. More particularly, the cold air duct **30** has a lower air inlet **32** within the freezer compartment **14** and an upper outlet end **34** connected to a fan **36** mounted on the back wall of the icemaker **22**. The fan **36** draws cold air from the freezer compartment and forces the cold air into the icemaker **22** so as to facilitate icemaking. It is understood that the fan **36** may be located at the inlet end **32** of the cold air duct **30**. The fan **36** controls the air flow from the freezer compartment **14** to the icemaking compartment **22** and may be a variable speed fan. The fan can be actuated by conventional means. The cold air duct **30** preferably resides within the rear wall of the refrigerator **10**, as seen in FIG. **5**. The arrow **35** designates the air flow through the cold air duct **30**.

The refrigerator **10** also includes a return air duct **38** having an upper end **40** connected to the icemaker **22**, and a lower end **42** terminating adjacent one of the air grates **26**. Alternatively, the lower end **42** of the return air duct **38** may extend into the freezer compartment **14**. Preferably, the return air duct **38** resides within the rear wall of the refrigerator **10**, as seen in FIG. **6**.

The icemaking compartment **22** also has an air vent for discharging air into the refrigerator compartment **14**. Thus, a portion of the air from the icemaking compartment **22** is directed through the return air duct **38** to the freezer compartment **14**, as indicated by arrow **43** in FIG. **3**, and another portion of the icemaking compartment air is vented through the opening **44** into the refrigerator compartment **12**, as indicated by arrows **45** in FIG. **3**.

As seen in FIG. **4**, the ice is discharged from the icemaker **22** in any conventional manner. Similarly, the ice dispenser **20** functions in a conventional manner.

Icemaker

As seen in FIG. **7**, an icemaker **50** is positioned within the icemaking compartment **22** with the ice storage area **54** with auger (not shown) removed for clarity. The icemaker **50** is mounted to an impingement duct **52**. The impingement duct receives freezer air coming from the freezer compartment through the cold air duct **30** and the fan assembly **36**. The opening **44** vents air into the refrigerator compartment **12**. The auger assembly (not shown) is provided beneath the icemaker **50** along with an ice storage bin with an insulated cover **23**. Impingement on the ice maker, as well as other aspects of ice making, is disclosed in Applicant's U.S. application Ser. No. 11/131,701 filed May 18, 2005 entitled REFRIGERATOR WITH IMPROVED ICEMAKER and is hereby incorporated by reference.

Ice Bin Assembly

The ice compartment **22** also includes an ice bin assembly **130**. The assembly **130** is removable for assembly, service, and user access to bulk ice storage. The components of the bin assembly **130** are shown in FIGS. **10** and **11**. The bin assembly **130** includes a tray or bin **132** for receiving ice from the icemaker **50**. An auger **134** is mounted within the tray **132**, with the first end **136** of the auger **134** being received in a motor **138** which is mounted in the upstream end **140** of the tray **132**. The second end **142** of the auger **134** is mounted in a housing **144** on a front plate **146** of the bin assembly **130**. A short piece of auger flighting **143** is provided on the second end **142** of the auger **134**, within the housing **144**. The housing **144** includes an outlet opening **148**, with a flipper door **150** in the housing **144** to control opening and closing of the outlet opening **148**. The flipper door **150** is mounted upon a shaft **152** extending through the tray **132**. A spring **154** mounted on the shaft **152** engages the flipper door **150** to normally bias the door **150** to a closed position over the outlet opening **148**. The shaft **152** can be turned by a solenoid (not shown) so as to move the flipper door **150** to an open position relative to the outlet opening **148**, such that ice can be discharged from the tray **132** to the dispenser **20**.

Front Cover Seal

A two-piece front cover **162** is provided on the bin assembly **130**. The front cover **162** includes an inner panel **164** and an outer panel **166**, as best seen in FIG. **11**. Insulation is provided between the inner and outer panels **164**, **166**, such that the front cover **162** is insulated. The inner panel **164** mounts onto the front plate **146** of the bin assembly **130**. A seal or compressible gasket **168** (FIG. **12**) is provided around the outer perimeter of the front plate **146** so that when the bin assembly **130** is installed into the ice box **122**, an air-tight seal is provided between the bin assembly **130** and the front opening **120** of the ice compartment **22**. The seal **168** helps maintain the lower temperature of the icemaking compartment **22**, as compared to the higher temperature of the fresh food compartment **12**. Since the ice compartment **22** is at a lower temperature than the fresh food compartment **12**, the two components must be sealed from one another.

The front cover **162** includes a latch mechanism for releasably locking the cover **162** to the ice compartment **22**. The latch mechanism includes a lock bar **170** extending through a pair of collars **172** on the front plate **146** of the bin assembly **130** for lateral sliding movement between a locked position engaging a catch **171** on the wall of the ice compartment **22** (FIG. **14**) and unlocked position disengaged from the catch **171** (FIG. **16**). The lock bar **170** is normally biased to the locked position by a spring **174**. A cam **176** is mounted on a peg **178** on the front plate **146** of the bin assembly **130** and is adapted to engage a flange or finger **180** on the end of the lock bar **170**. The cam **176** overcomes the bias of the spring **74** when actuated by a finger button **182** mounted on the outer panel **166**, so as to release the front cover **162** for removal of the bin assembly **130**. Thus, the bin assembly **130** can be slid into the ice box **122** and positively retained by the latch bar **170** with an air-tight seal to maintain the temperature of the ice compartment **22**. A user can depress the button **182** on the bin assembly **130** to unlock the lock bar **170** for removal of the bin assembly **130** from the ice box **122**. The seal **168** prevents air movement at the juncture of the removable bin assembly **130** and the ice compartment **22**. The latch bar **170** ensures that the bin assembly **130** is positively retained (FIGS. **14** and **15**) when closed with a slight compression of the gasket seal **168** (FIG. **18**).

Miscellaneous

Applicant's co-pending provisional application Ser. No. 60/613,241 filed Sep. 27, 2004, entitled APPARATUS AND METHOD FOR DISPENSING ICE FROM A BOTTOM MOUNT REFRIGERATOR, is hereby incorporated by reference in its entirety. This application and the provisional application both relate to a refrigerator with a bottom mount freezer and an icemaking compartment for making ice at a location remote from the freezer. However, it is understood that the ice compartment latch and seal of this application can also be used on a top mount or side-by-side refrigerator.

The invention has been shown and described above with the preferred embodiments, and it is understood that many modifications, substitutions, and additions may be made which are within the intended spirit and scope of the inven-

tion. From the foregoing, it can be seen that the present invention accomplishes at least all of its stated objectives.

What is claimed is:

1. A refrigerator comprising:

a fresh food compartment maintained at a temperature above 32 degrees F.;

an icemaking compartment maintained at a temperature below 32 degrees F.;

a freezer compartment located below the fresh food compartment, the freezer compartment maintained at a temperature lower than the temperature of the icemaking compartment;

an ice bin removably mounted in the icemaking compartment;

an icemaker in the icemaking compartment for supplying ice to the ice bin;

a cold air duct having an inlet at a supply of cold air and an outlet in communication with the icemaker;

a cover for selectively covering and permitting access to the ice bin and icemaker;

a gasket between the cover and the icemaking compartment to prevent air movement between the icemaking compartment and the fresh food compartment;

a releasable latch associated with the cover, the latch being adjustable between a locked position engaging a catch to thereby retain the cover in a position covering the icemaking compartment with the gasket compressed and an unlocked position disengaged from the catch to thereby permit the cover to be adjusted to permit access to the ice bin and icemaker such that the ice bin can be removed from the icemaking compartment;

wherein a freezer compartment is located below the fresh food compartment and at a height lower than the icemaking compartment;

a cold air duct having an inlet in communication with cold air from the freezer compartment and an outlet in communication with the icemaking compartment; and

a return duct with an inlet in communication with the icemaking compartment and an outlet in communication with the freezer compartment.

2. The refrigerator of claim **1**, wherein the ice compartment is not located on a door.

3. The refrigerator of claim **1**, wherein the cover is fixed to the ice bin.

4. The refrigerator of claim **1**, wherein the cover is insulated.

5. The refrigerator of claim **1**, wherein the latch is connected to the cover.

6. A refrigerator comprising:

a cabinet;

a fresh food compartment disposed in the cabinet;

a fresh food compartment door hingedly attached to the cabinet for at least partially covering and opening the fresh food compartment;

an ice dispenser in the fresh food compartment door that dispenses ice through the fresh food compartment door;

an icemaking compartment with an opening for receiving an ice bin, the ice bin being suitable for storing ice, the ice bin being removable from the icemaking compartment through the opening to transport ice within the bin to a location apart from the refrigerator;

an icemaker in the icemaking compartment for supplying ice the ice bin;

an ice moving member for moving ice from the ice bin to the ice dispenser;

a cover adjustable into a closed position to cover the opening and form a barrier between the icemaking compartment and the fresh food compartment, the cover being adjustable into an open position to permit removal of the ice bin from the icemaking compartment through the opening and to permit access to the icemaker;

a compressible seal between the cover and a wall of the icemaking compartment to prevent cold air from passing from the icemaking compartment into the fresh food compartment through the opening when the cover is in the closed position;

a latch for retaining the cover in the closed position with the seal compressed between the cover and the ice compartment;

a freezer compartment;

wherein the icemaking compartment is maintained at a temperature lower than a temperature of the fresh food compartment and higher than a temperature of the freezer compartment;

a cold air duct having an inlet in communication with cold air in the freezer compartment and an outlet in communication with the icemaking compartment for supplying cold air to the icemaker; and

a return duct with an inlet in communication with the icemaking compartment and an outlet in communication with the freezer compartment.

7. The refrigerator of claim **6**, wherein the freezer compartment is located below the fresh food compartment and at a height lower than the icemaking compartment.

8. The refrigerator of claim **6**, wherein the icemaking compartment is fixed within the cabinet.

9. The refrigerator of claim **6**, wherein the cover is fixed to the ice bin.

10. The refrigerator claim **6**, wherein the cover is insulated.

11. The refrigerator of claim **6**, wherein the ice moving member is a rotatable auger.

* * * * *